

phagocytes which pass out through the dermal branchiæ. In conclusion, I should state that clumps of corpuscles occur, here and there, in the pore canals of the madreporite both of *Asterias rubens* and *Cribrella ocellata* as seen in sections. The madreporites and neighbouring structures were removed from full-grown specimens and then placed in hardening fluids: this being so, I think it not improbable that these corpuscles came from the cut end of the "heart," and arrived at their position by the outward ciliary current, recently described by Dr. Hartog.* It is difficult to conceive that such an outflow of corpuscles should take place normally; for then there must be a continual loss of *ordinary* as well as of *sphæruliferous corpuscles*.

EXPLANATION OF PLATE 3.

FIG. 1.—Section through a dermal branchia of *Asterias rubens*, after Indian ink injection. *c. e.*, cœlomic epithelium; *c. t.*, connective tissue; *e.*, epidermis; *cut.*, cuticle.

FIG. 2.—Corpuscles containing granules of Indian ink, taken off a branchia. *b*, sphæruliferous corpuscle.

FIG. 3.—Section through terminal portion of dermal branchia. Note the plug of corpuscles (*p*) and crowding of epiderm nuclei at its sides. The other letters as in fig. 1.

FIG. 4.—Sphæruliferous cells from slime. *l*, liberated sphærules.

II. "Note on the Madreporite of *Cribrella ocellata*." By HERBERT E. DURHAM, B.A., lately Vintner Exhibitioner, King's College, Cambridge. Communicated by P. HERBERT CARPENTER, D.Sc., F.R.S., F.L.S. Received January 5, 1888.

I have a series of vertical longitudinal (radial) sections carried through the madreporite, &c., of a full-grown specimen of *Cribrella ocellata*: in this series the madreporic canals have a peculiar relation to the stone canal or water-tube.

Most of the pore canals pass into collecting canals which open into the stone canal directly: some few, however, lead into the space below the madreporite, which is the upper extremity of the "schlauchförmiger Kanal." The stone canal dilates laterally on each side into an "ampulla," and one of these lateral lobes of the ampulla has an aperture into the "schlauchförmiger Kanal." Now the "schlauchförmiger Kanal" is derived from the enterocœle (Hamann),† so that in the specimen described there is a permanent connexion between the hydrocœle cavity and the enterocœle cavity.

* M. M. Hartog, 'Ann. Mag. Nat. Hist.,' Nov. 1887.

† O. Hamann, 'Die Asteriden,' p. 51, Jena, 1885.

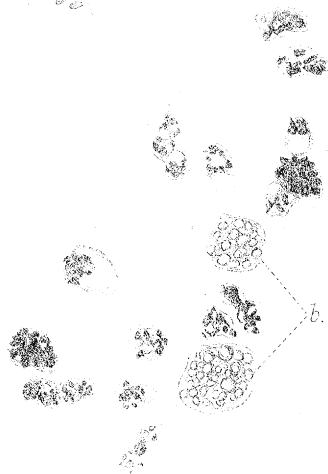
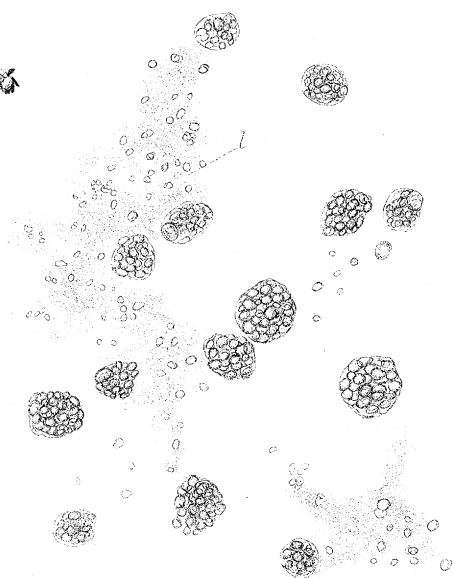


Fig 2 (x 600)

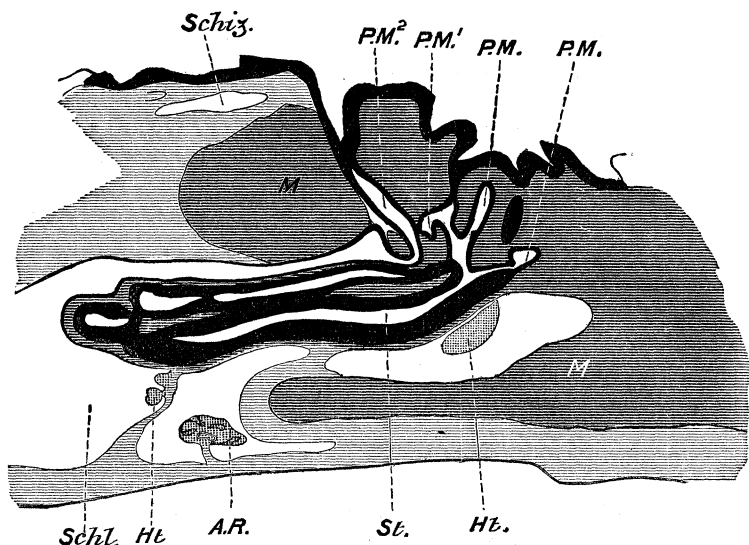
Fig 3 (x 100)

Ludwig* states that he was unable to find any such connexion (a connexion which would explain the injection results obtained by many observers) in the forms investigated by him, and I can confirm his statement for *Asterias rubens*. Neither in *A. rubens* nor in *Cribrella ocellata* have I detected any connexion between the water vascular and "blood vascular" systems in this region of the body.

Section 1 (fig. 5) passes along the upper extremity of the stone canal between the dilatations, and through one of the abnormal pore canals (PM²); by examination of neighbouring sections it is seen that the lumen of the pore canal is continuous from the exterior to the "schlauchförmiger Kanal" (Schl) and also that there is a communication between the canals (PM¹) and (PM²). Two other canals (PM) are seen opening into the stone canal (St).

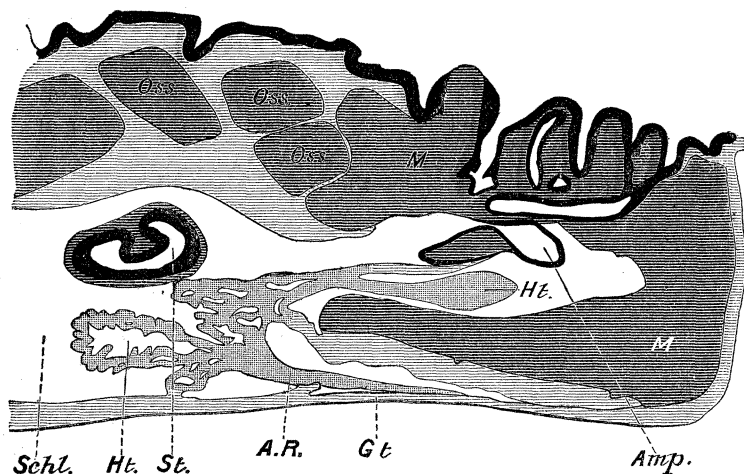
Section 2 (fig. 6) passes through the aperture of communication between the *ampulla* and the "schlauchförmiger Kanal." In this section the continuity of the "heart" or dorsal organ (Ht) and anal "blood" ring (AR) is seen; also a gut vessel (Gt) from the latter.

FIG. 5.



* H. Ludwig, 'Zeitschr. Wiss. Zool.,' vol. 30, 1878, pp. 103, 104.

FIG. 6.



I am not in a position to state that such is the usual arrangement in *Cribrella*: but that such a connexion should exist even as an abnormality is not without interest. Mere closure of the internal aperture of the ampulla would not lead to the common asterid arrangement, because of the canals (PM^2 and PM^1) and others with similar relations, which are some distance from the aperture of the ampulla.

EXPLANATION OF LETTERS.

- Amp. Ampulla.
 A.R. Anal "blood vascular" ring.
 Gt. Tract of "blood-vessels" to gut.
 Ht. "Heart" or dorsal organ.
 M. Madreporic ossicle.
 Oss. Ossicles in body wall.
 PM }
 PM^1 } Pore canals of madreporite.
 PM^2 }
 Schl. "Schlauchförmiger Kanal."
 St. Stone canal.

SHADING.

- Light. Connective tissue and muscle.
 Dark. Ossicles.
 Black. Epithelium of stone canal, &c.
 Cross. "Blood vascular" tracts.

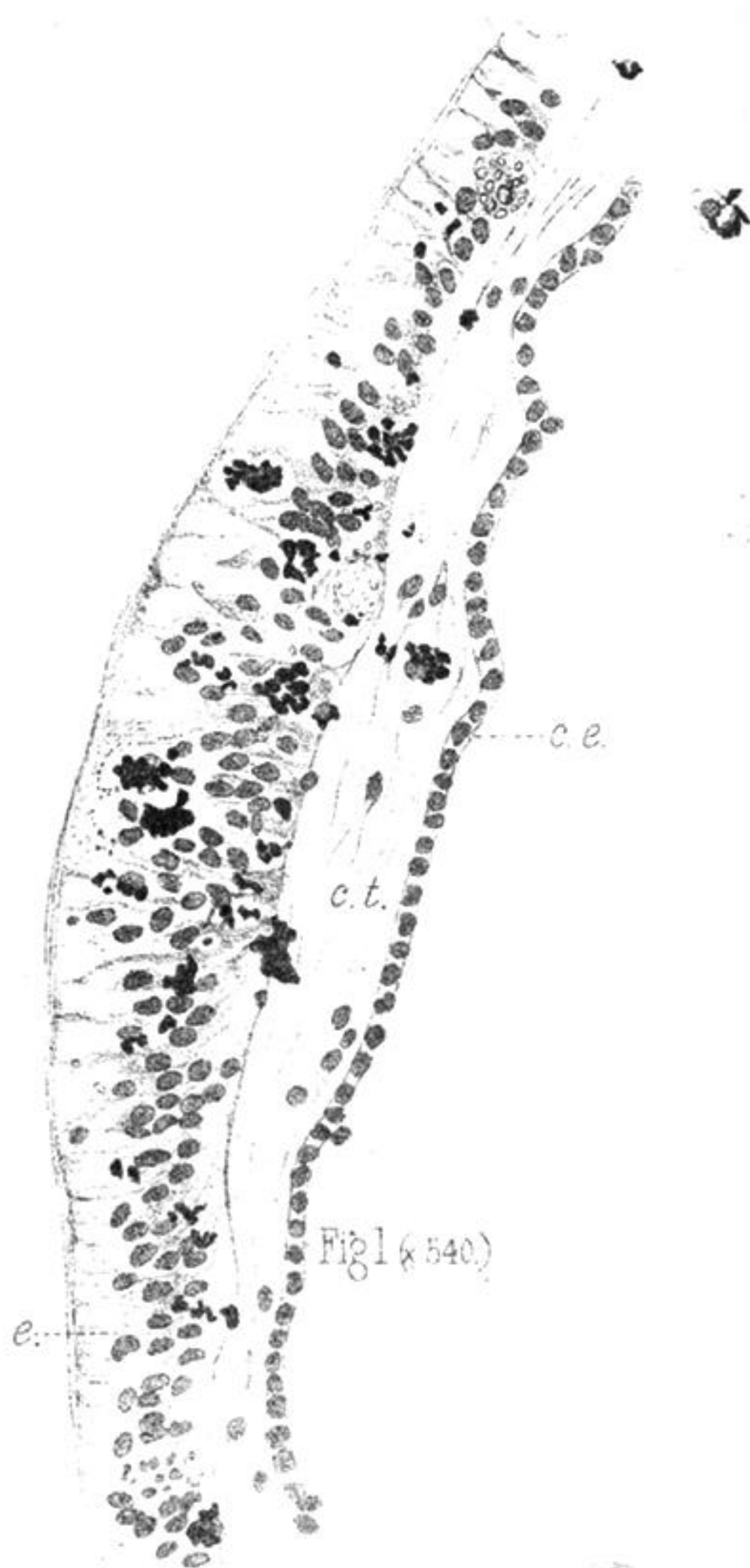


Fig 1 (x 540.)

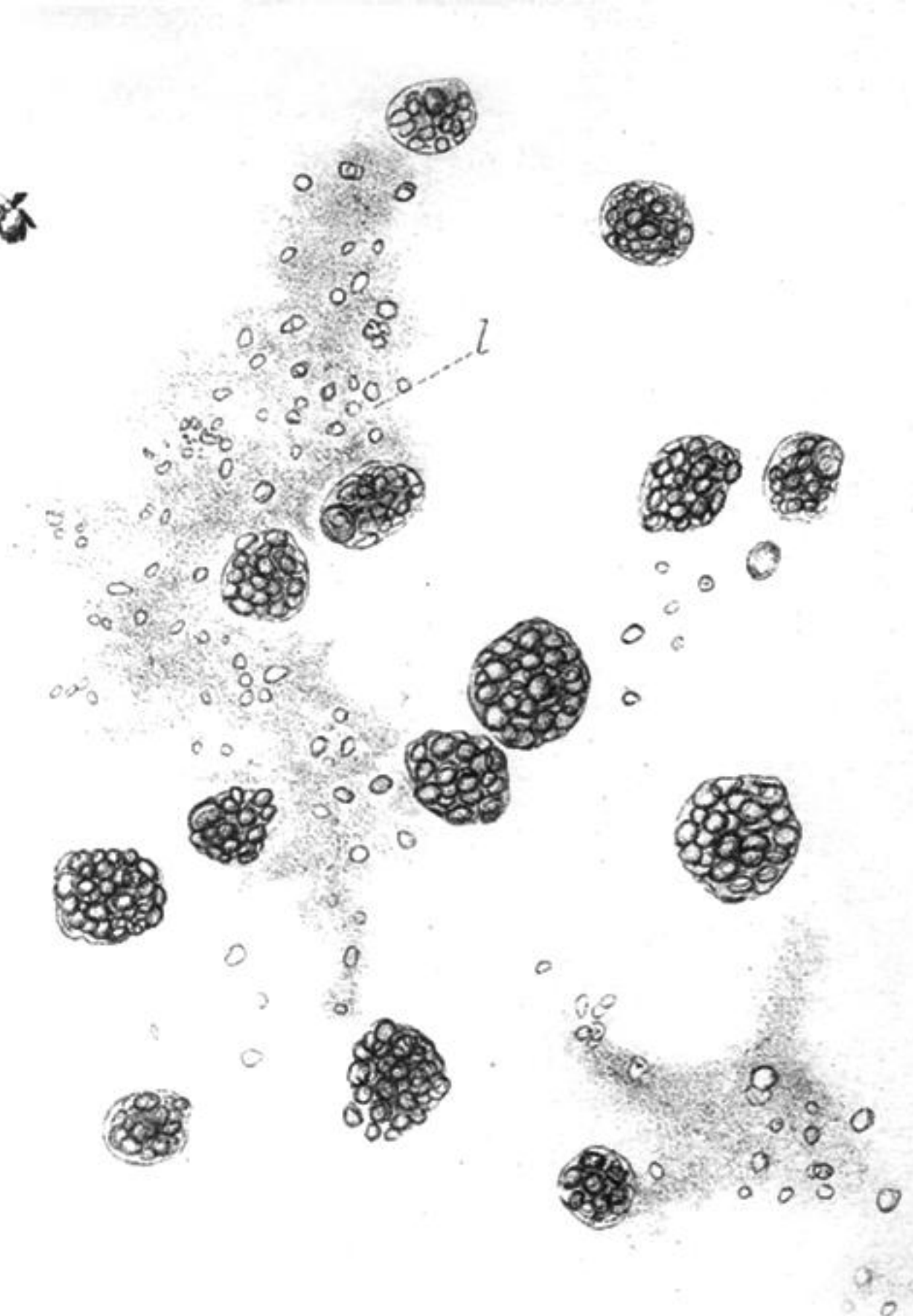


Fig 4 (x 690.)

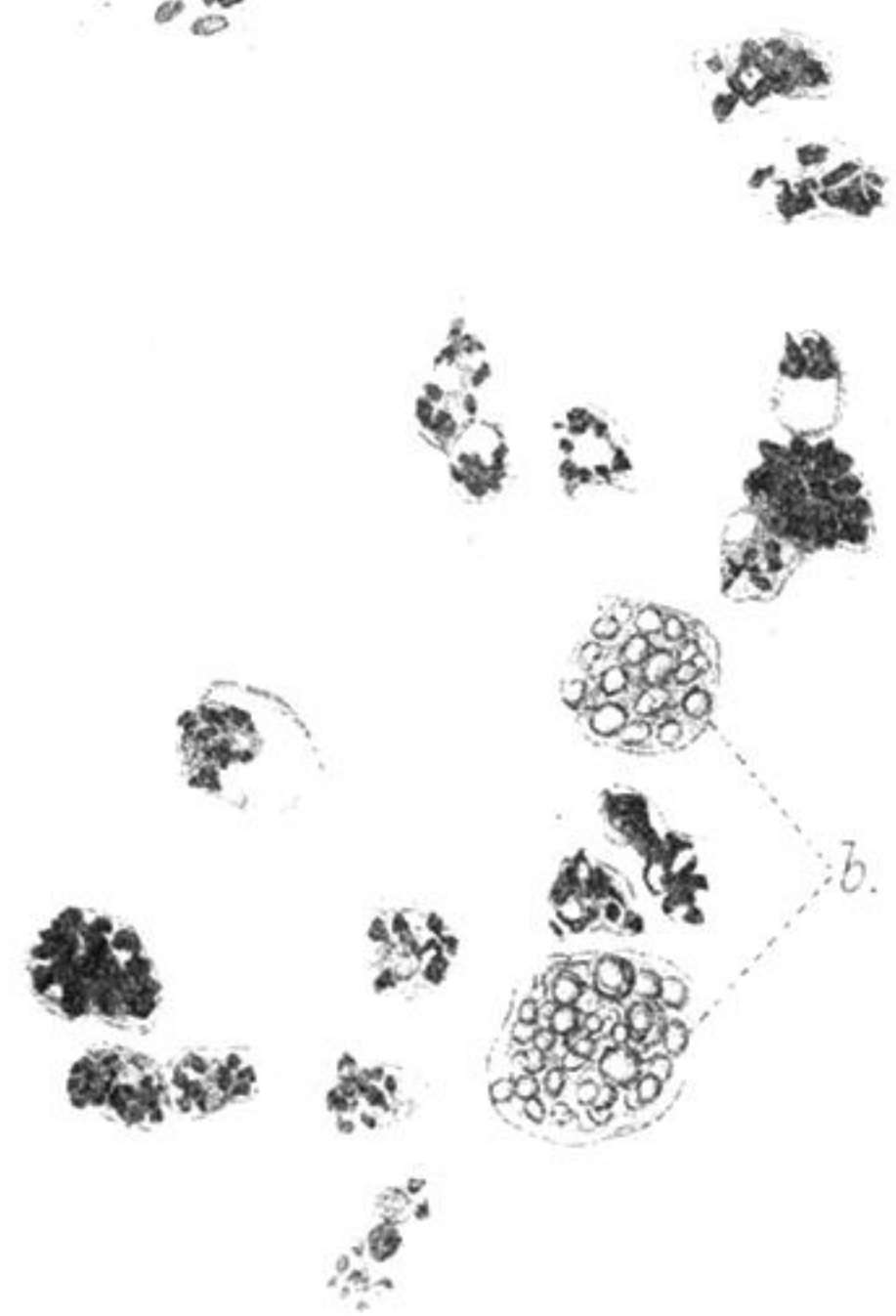


Fig 2 (x 690.)



Fig 3 (x 190.)

FIG. 5.

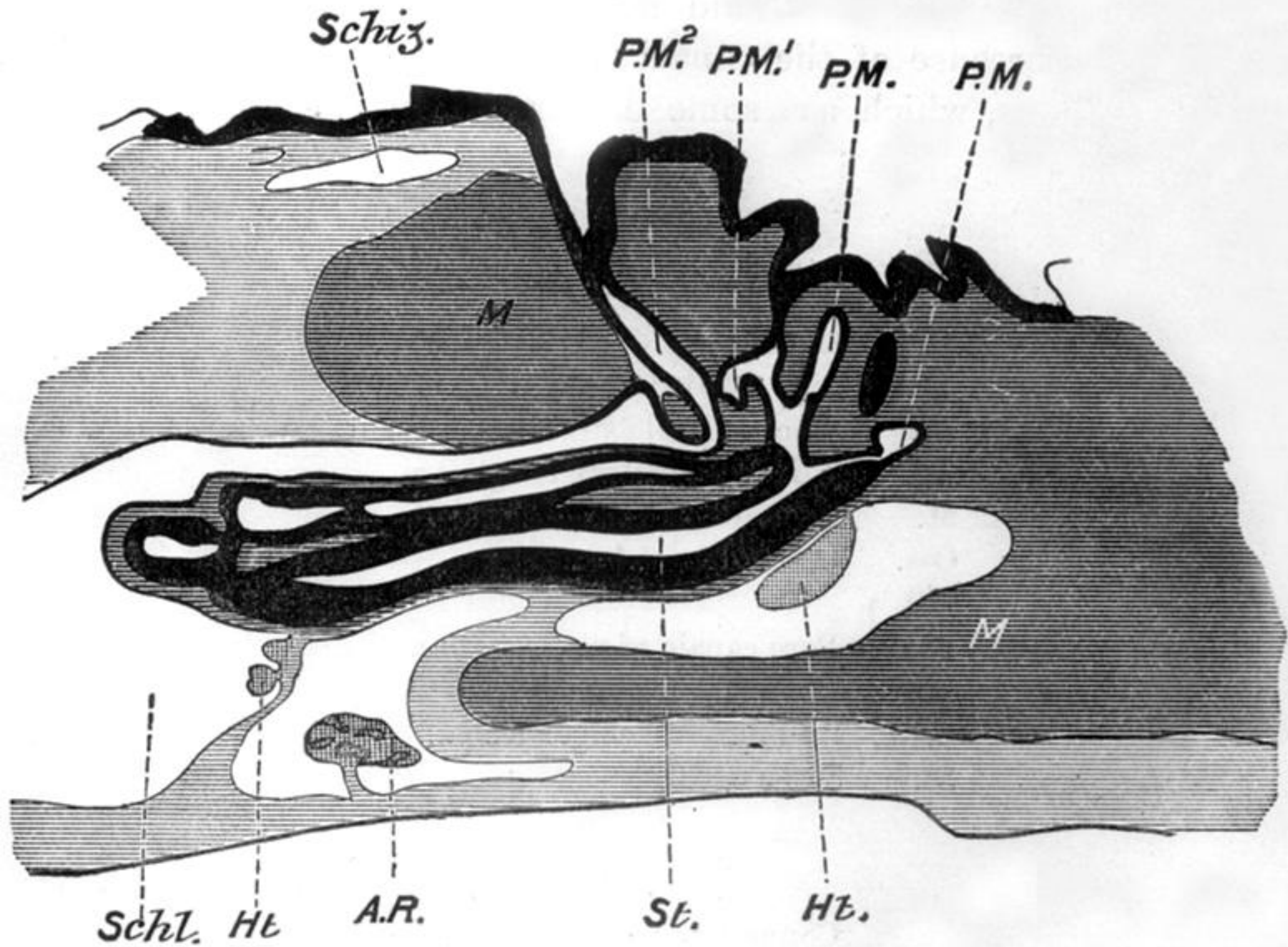


FIG. 6.

